MARKED UP VERSION OF CLAIMS

1. (Once Amended) A method of monitoring a sample containing a neutron source in which:

i) signals from a plurality of neutron detectors are analysed and the count rates for single, double and triple incidence of neutrons on the detectors are determined;

ii) the single, double and triple count rates are equated to a mathematical function related to the spontaneous fission rate, self-induced fission rate, detection efficiency and α,n reaction rate;

iii) a probability distribution is assigned to each of the self-induced fission rate, detection efficiency and α,n reaction rate and each of the counting rates to provide a probability distribution factor for any given value, wherein the probability distribution assigned to,

the single, double, and triple count rates is a normal distribution,

the self-induced fission rate is a flat distribution,

the detector efficiency is a triangular distribution, and

the α,n reaction rate is a triangular distribution;

iv) and the value of the product of all the probability distribution factors is increased to give an optimised solution and so provide a value for the spontaneous fission rate which is linked to the mass of the neutron source.

10. (Once Amended) A method according to claim [6]1 in which the distribution(s) are constrained within certain applied constraints/boundaries, such that the probability distribution factor is zero beyond the constraints or such that the probability distribution factor rapidly tends to zero beyond certain values.

11. (Once Amended) A method according to claim [6]1 in which one or more of the constraints are set according to information gathered from a preceding isotopic consideration or analysis of the sample.

12. (Once Amended) A method according to claim [6]1 in which the increasing, and preferably maximisation, of the product of the probability distribution factors (pdf's) is preferably performed as an iterative process.